

Claims

1. A method for regulating the traction in a line (13) of a ladder climbing assistance device, which method comprises the steps of:

- 5 – sensing any movement of the line (13); and
- when no traction is applied to the line (13) and movement of the line is sensed for a first predetermined period of time, the traction is increased to a predetermined high level (L_1); and
- 10 – when traction is applied to the line (13) and movement of the line is sensed for a second predetermined period of time, the traction is maintained at the predetermined high level (L_1); and
- when traction is applied to the line (13) and no movement of the line is sensed for the second predetermined period of time, the traction is decreased to a predetermined low level (L_0).

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2. A method according to claim 1, **characterised in** that both the first and second predetermined periods of time are set between 0.1 and 10 seconds, preferably between 0.2 and 5 seconds, and most preferably between 0.4 and 2 seconds.

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3. A method according to claim 1 or 2, **characterised in** that the predetermined high level (L_1) for the traction is set between 100 N and 800 N, preferably between 200 N and 600 N, and most preferably between 300 N and 500 N.

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4. A method according to any one of claims 1-3, **characterised in** that the predetermined low level (L_0) for the traction is set below 100 N, preferably below 50 N, and most preferably set to 0 N.

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5. A method according to any one of claims 1-4, **characterised in** that the decrease of the traction the predetermined low level (L_0) takes place over a period of time.

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6. A method according to claim 5, **characterised in** that said period of time for decreasing the traction is set between 0.1 and 10 seconds, preferably

between 0.2 and 5 seconds, and most preferably between 0.4 and 2 seconds.

5 7. A method according to any one of claims 1-6, **characterised in** that movement of the line (13) generates discrete pulses, and that movement is sensed if the number of pulses exceeds a preset value (N) for the first predetermined periods of time and the second predetermined periods of time, respectively; and that no movement is sensed if the number of pulses is less than the preset value (N) for the first predetermined periods of time
10 and the second predetermined periods of time, respectively.

8. A ladder climbing assistance device for use with an essentially vertical ladder (1), said ladder climbing assistance device comprising:
– a line (13) that is movable along the ladder (1);
15 – a motor (8) with a power outlet arranged to provide an essentially constant traction in the line (13);

characterised in that the ladder climbing assistance device comprises sensing means (25) for sensing any movement of the line (13), which sensing means is connected to controlling means (26) for controlling the power outlet from the motor (8) in response to signals from the sensing means, which controlling means (26) is arranged to control the power outlet from the motor (8) to:
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– increase the traction in the line (13) to a predetermined high level (L_1) when movement of the line is sensed for a first predetermined period of time; and
25 – maintain the traction in the line (13) at the predetermined high level (L_1) when traction is applied to the line and movement of the line is sensed for a second predetermined period of time; and
– decrease the traction in the line (13) to a predetermined low level (L_0) when no movement of the line is sensed for the second predetermined period of time.
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9. A ladder climbing assistance device according to claim 8, **characterised in** that the sensing means (25) comprises an inductive sensor arranged in

proximity of a driving wheel (10) that is connected to the motor (8) and is in frictional engagement with the line (13).

- 5 10. A ladder climbing assistance device according to claim 9, **characterised in** that the driving wheel (10) is provided with an annular V-shaped groove (18), and that transversally through-going bores (19) are provided close to the rim; the inwardly facing edges of the bores (19) providing frictional engagement with the line (13) and the outwardly facing edges of the bores (19) providing means that are sensible by the inductive sensor.
- 10 11. A ladder climbing assistance device according to any one of claims 8-10, **characterised in** that the sensing means (25) is arranged to generate discrete pulses, and that movement is sensed if the number of pulses exceeds a preset value (N) for the first predetermined periods of time and
- 15 the second predetermined periods of time, respectively; and that no movement is sensed if the number of pulses is less than the preset value (N) for the first predetermined periods of time and the second predetermined periods of time, respectively.
- 20 12. A ladder climbing assistance device according to any one of claims 8-11, **characterised in** that the controlling means (26) comprises an I/O unit that is programmed to control the power outlet from the motor (8) in dependence of the signals from the sensing means (25).
- 25 13. A ladder climbing assistance device according to any one of claims 8-12, **characterised in** that the line (13) forms a closed loop.